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10/060,826

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Daniel S. Pickard

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EXAMINER

LEE, WILSON

ART UNIT

PAPER NUMBER

2821

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/060,826

**Applicant(s)**

PICKARD ET AL.

**Examiner**

Wilson Lee

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16 and 17 is/are rejected.
- 7) ☒ Claim(s) 15 and 18-20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

### **Response to Arguments**

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

### **Claim Rejections – 35 U.S.C. 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 2, 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Pu et al. (6,273,022).

Regarding Claim 1, Pu discloses a matching network (See Figure 9) for coupling an RF power supply (32) to an RF antenna (42) in a plasma generator comprising:

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- a resonantly tunable circuit formed of a variable capacitor and a inductor (40a) in a series resonance configuration;
- a ferrite core transformer (38) coupled to the resonantly tunable circuit.

Regarding Claim 2, Pu discloses that the transformer comprises a secondary winding which couples the transformer to the tunable circuit and a primary winding.

Regarding Claim 5, Pu discloses that the transformer comprises a core which is made of a plurality of ferrite core (See Figures 2-5).

### **Claim Rejections – 35 U.S.C. 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 4, 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pu et al. (6,273,022).

Regarding Claim 3, as discussed above, Pu essentially discloses the claimed invention but fails to explicitly disclose that the secondary winding is a single turn winding and the primary winding is a multi-turn winding. However, it would have been obvious to one of ordinary skill in the art to provide any desired number of winding in Pu in order to meet the required and desired power output which involves routine skill in the art.

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Regarding Claim 4, Pu discloses that the transformer comprises a core which is made of a plurality of ferrite core (See Figures 2-5).

Regarding Claim 6, as discussed above, Pu essentially discloses the claimed invention but fails to explicitly disclose the turn ratio between the primary winding and secondary winding. However, it would have been obvious to one of ordinary skill in the art to provide any desired turn ratio in Pu in order to meet the required and desired power output which involves routine skill in the art.

Regarding Claim 7, Pu, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that turn ratio is selected to transform the plasma impedance of plasma generator to 50  $\Omega$ . However, it would have been obvious to one of ordinary skill in the art that the ratio is selected to transform the plasma impedance of plasma generator to 50  $\Omega$  in order to efficiently render the plasma energy from the RF source. It is held that the provision of adjustability, where needed, involves only routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA 1954).

Regarding Claim 8, Pu, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that the transformer comprises a core being made of 12 ferrite cores with 1.25 inch OD and 0.75 inch ID, being made of M-type ferrite. However, it would have been obvious to one of ordinary skill in the art to utilize any number of commercial available ferrite cores with specific dimension in Pu to match with the source and load in order to attain desired voltage output. It is held to be within the general skill of a worker in the art to select a known commercial material and type of a device on the basis of its

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suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding Claim 9, Pu discloses a variable capacitor (C) but does not disclose the capacitor having capacity range of 5-125pF. However, it would have been obvious to one of ordinary skill in the art to tune the capacitance of the capacitor to any desired range in order to attain desired output. It is held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA 1955).

Regarding Claim 10, Pu, as discussed above, essentially discloses the claimed invention but fails to disclose that the matching network fits within a cylindrical cavity 6 inches in diameter and 8 inches long. However, it would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Claims 1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernier (4,629,887).

Regarding Claim 1, Bernier discloses a matching network for coupling an RF power supply (2 shown in figs 1, 2) to an RF antenna (Rt) in a plasma generator comprising:

- a resonantly tunable circuit formed of a variable capacitor (C) and a inductor (Lt) in a series resonance configuration;

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- a transformer coupled to the resonantly tunable circuit (the transformer shown on the left side of the capacitor (C) See Figure 6).

As discussed above, Bernier discloses the claimed invention but does not explicitly disclose that the transformer is a ferrite core type. However, it would have been obvious to one of ordinary skill in the art to use a ferrite core transformer in Bernier in order to magnetize and demagnetize more rapidly. Such knowledge has been well known to a skilled in the art.

Regarding Claim 2, Bernier discloses that the transformer comprises a secondary winding which couples the transformer to the tunable circuit and a primary winding.

Regarding Claim 3, as discussed above, Bernier essentially discloses the claimed invention but fails to explicitly disclose that the secondary winding is a single turn winding and the primary winding is a multi-turn winding. However, it would have been obvious to one of ordinary skill in the art to provide any desired number of winding in Bernier in order to meet the required and desired power output which involves routine skill in the art.

Regarding Claim 6, as discussed above, Bernier essentially discloses the claimed invention but fails to explicitly disclose the turn ratio between the primary winding and secondary winding. However, it would have been obvious to one of ordinary skill in the art to provide any desired turn ratio in Bernier in order to meet the required and desired power output which involves routine skill in the art.

Regarding Claims 7, 11, Bernier, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that turn ratio is

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selected to transform the plasma impedance of plasma generator to 50  $\Omega$ .

However, it would have been obvious to one of ordinary skill in the art that the ratio is selected to transform the plasma impedance of plasma generator to 50  $\Omega$  in order to efficiently render the plasma energy from the RF source. It is held that the provision of adjustability, where needed, involves only routine skill in the art.

*In re Stevens*, 101 USPQ 284 (CCPA 1954).

Regarding Claim 8, Bernier, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that the transformer comprises a core being made of 12 ferrite cores with 1.25 inch OD and 0.75 inch ID, being made of M-type ferrite. However, it would have been obvious to one of ordinary skill in the art to utilize any number of commercial available ferrite cores with specific dimension in Bernier to match with the source and load in order to attain desired voltage output. It is held to be within the general skill of a worker in the art to select a known commercial material and type of a device on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding Claim 9, Bernier discloses a variable capacitor (C) but does not disclose the capacitor having capacity range of 5-125pF. However, it would have been obvious to one of ordinary skill in the art to tune the capacitance of the capacitor to any desired range in order to attain desired output. It is held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA 1955).



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Regarding Claim 10, Bernier, as discussed above, essentially discloses the claimed invention but fails to disclose that the matching network fits within a cylindrical cavity 6 inches in diameter and 8 inches long. However, it would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

Regarding Claim 12, Bernier discloses a plasma ion source comprising:

- a RF power supply(2 shown in Figs 1, 2);
- a coaxial cable (W1 shown in Fig 4) connected to the RF power supply;
- a matching network having an input connected to the coaxial cable, comprising:
  - o a resonantly tunable circuit formed of a variable capacitor (C17) and an inductor (L19) in series resonance configuration;
  - o a transformer coupled to the resonantly tunable circuit ;
- a RF antenna (Fig 7) connected to an output of the matching network;
- a plasma ion generator (19) having the RF antenna mounted therein for inductively generating a plasma.

As discussed above, Bernier discloses the claimed invention but does not explicitly disclose that the transformer is a ferrite core type. However, it would have been obvious to one of ordinary skill in the art to use a ferrite core transformer In Bernier in order to magnetize and demagnetize more rapidly. Such knowledge has been well known to a skilled in the art.

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Regarding Claim 13, Bernier discloses that the transformer comprises a secondary winding which couples the transformer to the tunable circuit and a primary winding.

Regarding Claim 14, as discussed above, Bernier essentially discloses the claimed invention but fails to explicitly disclose that the secondary winding is a single turn winding and the primary winding is a multi-turn winding. However, it would have been obvious to one of ordinary skill in the art to provide any desired number of winding in Bernier in order to meet the required and desired power output which involves routine skill in the art.

Regarding Claim 16, as discussed above, Bernier essentially discloses the claimed invention but fails to explicitly disclose the turn ratio between the primary winding and secondary winding. However, it would have been obvious to one of ordinary skill in the art to provide any desired turn ratio in Bernier in order to meet the required and desired power output which involves routine skill in the art.

Regarding Claim 17, Bernier, as discussed above, essentially discloses the claimed invention but fails to explicitly disclose that turn ratio is selected to transform the plasma impedance of plasma generator to 50  $\Omega$ . However, it would have been obvious to one of ordinary skill in the art that the ratio is selected to transform the plasma impedance of plasma generator to 50  $\Omega$  in order to efficiently render the plasma energy from the RF source. It is held that the provision of adjustability, where needed, involves only routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA 1954).

**Allowable subject matter**

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Claims 15, 18-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### **Correspondence**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Wilson Lee whose telephone number is (571) 272-1824.

Papers related to Technology Center 2800 applications may be submitted to Technology Center 2800 by facsimile transmission. Any transmission not to be considered an official response must be clearly marked "DRAFT". The official fax number is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Wilson Lee  
Primary Examiner  
U.S. Patent & Trademark Office

8/23/04